

**OPERATIONS RESEARCH MODELS FOR MANUFACTURING SYSTEMS
IE412, FALL 2025**

COURSE INFORMATION

Designated Class Times: TR 12:30-1:50 PM
Classroom: 103 Transportation Building
(NOTE: The first two weeks of the course will take place online – see “Course Structure and Policies”)

Credit Hours: 3 hours (4 hour option for graduate students)
Course Websites: <https://canvas.illinois.edu> (primary course website)
<https://www.gradescope.com/> (submitting assignments, see “Assignment Policies”)

Instructor: Douglas M. King, Ph.D. (dmking@illinois.edu)

Office Hour*: Mondays, 3:30-4:20PM CT (on Zoom)

* - Office hours may also be available by appointment (please arrange by email, providing at least 24-hours of advance notice)

Textbook: "Supply Chain Management", Sunil Chopra and Peter Meindl (5th Edition)

Prerequisite: IE 310 (required)

Course Type (ISE): Selected Elective (IE Curriculum)

Course Description: This course is intended to be an introduction to operations research models used in manufacturing scenarios, with emphasis on supply chain management.

Learning Outcomes: Following the completion of this course, students should be able to...
(¹⁻⁷: ABET Outcomes) ...develop a systematic framework for analyzing supply chain networks ^{1,2}
...understand the typical firms in a supply chain and their role in supply chain performance ^{1,2}
...apply operations research models to improve supply chain performance ^{1,2}

COURSE STRUCTURE AND POLICIES

OVERVIEW: To best provide you with a flexible and stable academic experience to learn the course materials, the course has been structured to add flexibility and mitigate the impact of factors that would prevent you from engaging with the course.

- **Online for the First Two Weeks:** All class activities for the first two weeks of the semester will be held online. Lectures will be provided by prerecorded lecture videos, with additional (optional) synchronous opportunities to discuss the course and its topics. Details will be provided on Canvas.
- **Online Assessments:** Many course assessments for the semester will be administered online. Assignments will be submitted through Gradescope, and Quizzes will be taken on Canvas. Policies for individual assessments can be found in the “Grading and Policies” section of this document. The Course Calendar pdf shows the planned schedule of all course assessments (except quizzes; see “Quiz Policies – Schedule” section of this document for more information).
- **Lecture Videos:** While students can attend lectures in person once the on-campus lectures begin, doing so is not required. Prerecorded lecture videos will continue to be provided throughout the semester, so students can keep up with the course content even if they cannot attend a particular lecture, or if they prefer to watch the lectures asynchronously.

Course Announcements and Interaction Opportunities: You will have several ways to interact with the course staff and with your fellow students, and to ask course policy questions to course staff even during the two weeks before the on-campus lectures begin. Course announcements will be made throughout the semester to keep you apprised of key milestones, deadlines, and requirements.

- **Canvas Announcements:** The Announcements page on Canvas will be your primary source for critical course-related announcements (e.g., updates in course policies or deadlines). You are responsible for being aware of these announcements; checking at least once each business day is recommended to ensure prompt notification, and to avoid missing any announcements or deadlines.
- **Canvas Calendar:** In addition to the Course Calendar pdf, important dates will also be posted in the calendar section of Canvas.
- **Discussion Board:** A discussion board is available on Canvas where course staff will respond to course questions. Students are also encouraged to discuss their questions with one another by posting an existing thread or creating a new thread.
- **Office Hours:** For discussion of course content in a synchronous environment (e.g., outside of the discussion board). The office hour schedule is posted at the beginning of this syllabus; office hours may also be available by appointment.
- **Email:** For general questions outside of office hours, as well as all student-specific questions (e.g., grade-related).
- **NOTE – Student-Specific Questions:** During the course, you may have questions specifically related to your personal circumstances or grades. To maintain the confidentiality of this information, please ask these questions via email to course staff, or in an individual appointment with course staff. To preserve the confidentiality of your personal information, course staff will not respond to these questions in publicly-accessible environments (e.g., on the discussion board).

Attendance: While much of the course content can be accessed under a flexible asynchronous schedule if the student prefers, it is expected that you will keep pace with the course as it progresses. This includes keeping up with the lecture topics as they are covered, completing homework assignments by their deadlines, taking exams according to their (synchronous) schedule, and so forth. If you anticipate an extended and unavoidable period where you will be unable to access or participate in the course, or unavoidable absences during critical course meetings (e.g., exams), please alert the instructor as soon as possible if you believe that course-related accommodations beyond those provided in this syllabus are necessary and justified. Such cases will be considered on a case-by-case basis and will require additional University documentation (typically including, but not limited to, an absence letter from the Office of the Dean of Students).

Access to Electronic Materials: Access to electronic recordings used in this course is offered only for students enrolled in the course via the posted platforms, and only for the duration of the course. Recording or storing recordings of any course materials, including lectures, discussions, or other activities is forbidden. Sharing recorded material or posting it online is also forbidden. Any violation of these policies will be forwarded to the Office of Student Conflict Resolution for disciplinary action.

GRADING AND POLICIES

Grades will be based on the following:	Exams (two – midterm and final)	65%	(40% and 25%, see “Exam Policies”)
	Homework assignments	30%	
	Quizzes	5%	

Exam Policies (Midterm and Final):

- **Schedule:** Exam dates will be announced on Canvas. The midterm exam will be scheduled to take place during designated class time, and the final exam will be scheduled according to University guidelines. **Exams must be taken synchronously according to the designated schedule.** Please plan ahead to be available during the exams.
- **Exam Logistics:** I have not yet determined whether the exams will be held through an online platform or whether they will be held in person. Once this has been determined, I will provide more information about the exam logistics so you know what to expect (allowed materials, etc.).
- **Absences and Accommodations:** To ensure that student performance is assessed uniformly, make-up exams are only offered in rare circumstances. Students who have an unavoidable, University-approved, and documented reason to be absent during the midterm exam will have their final exam score replace it when determining course grades. Make-up final examinations are only offered if required by University policy, or a student has made arrangements with their college to receive an “I” (Incomplete) grade in the course. Other missed examinations will receive a grade of zero. Please notify the instructor as early as possible if you believe you will need to take a make-up final exam; make-up exam arrangements will be made on a case-by-case basis. To accommodate extraordinary and unavoidable circumstances that may arise and negatively impact exam performance, students who take both exams will have their better exam score weighted more heavily when determining their course grade; the better exam score will count for 40% of their course grade and the lower exam score will count for 25% of their course grade.
- **Regrades:** If you believe that an error has been made while grading your exam, please alert the instructor via email within one week after the exam scores are posted. This email must include rationale for why you believe additional credit is justified. Be as specific as possible; requests with insufficient rationale may be disregarded. No regrade requests will be accepted after the one-week deadline has passed.

Quiz Policies: Quizzes will be held to assess student engagement in the course and understanding of course topics.

- **Schedule:** Quiz dates may or may not be announced in advance. Once posted, any quiz will be available until at least 24 hours after start of the next designated class session. For example, a quiz posted on a Monday would available until at least 12:30PM CT on Wednesday (i.e., 24 hours after the start of the designated class session on Tuesday).
- **Platform:** Quizzes will be held on Canvas, and will be posted in the “Quizzes” module when they are available.
- **Quiz duration:** Most quizzes will be timed, and the duration of each quiz will be shown before you begin the quiz; the duration of each timed quiz will typically be 5-20 minutes.
- **Absences: Make-up quizzes are not offered.** Any missed quiz will receive a grade of zero. To accommodate unavoidable absences that may occur during the semester, each student’s lowest quiz score will be dropped.
- **Allowed materials:** The quizzes are open-book and open-notes. Calculators are allowed. Other than referencing an electronic version of the course slides (as posted on Canvas) or your own personal notes, you are not permitted to access other Internet resources (e.g., websites or other Internet sources). Contacting or otherwise consulting with other people during a quiz is not permitted.

Assignment Policies:

- **Schedule:** Five homework assignments will be collected throughout the semester. Due dates will be posted on Canvas; you will have approximately one week to complete each assignment.
- **Platform/Submission:** Assignments will be submitted via Gradescope. Instructions for how to submit homework assignments will be provided. Please follow these instructions carefully! **Late submissions will not be accepted!** Each student’s lowest homework assignment score will be dropped.
- **Access to Gradescope:** Students will be added to the Gradescope roster after the tenth day of classes; an announcement will be made on Canvas once the roster has been added. If you add the course after that time, or find that you do not have access to the course’s Gradescope site after this announcement is posted, please contact the instructor as soon as possible.
- **Regrades:** After each assignment is returned, there will be a one-week period when regrade requests will be permitted. These requests must be made via Gradescope, and must include detailed rationale for why you believe additional credit is justified. This rationale should be as specific as possible, and refer to specific errors that were made in the grading (e.g., if you believe that some of your work was missed or misinterpreted by the grader, such that you did not receive credit for work that you submitted). Requests with insufficient rationale may be disregarded. No regrade requests will be accepted after the one-week deadline has passed.
- **Assignment Groups:** You will submit assignments in groups of two to three students. Groups will be created based on a Group Preference Form that each student will be asked to submit. More details will be provided.

Graduate Students (Four Credit Option): Graduate students enrolled for four credit hours will study additional topics and complete additional work to earn the additional hour of credit. The exact nature of this additional work has not yet been determined; the additional topics may be sourced from additional chapters of the textbook or from research papers, and the additional work may involve extra questions on exams, extra homework assignments, a project, or a combination thereof. The quality of this work will impact the course grade. More information will be provided around the

end of the third week of the semester. Graduate students are responsible for enrolling in the proper credit level by the University deadline; changes will not be permitted after the deadline has passed.

Computation Policies (Assignments/Exams/Quizzes): For computational questions on quizzes, please report your final numerical answer; provide at least four significant digits, to ensure that your work can be properly assessed. On homework assignments, please simplify any computations to a final numerical answer; show all your work to demonstrate your understanding of course content so partial credit can be assessed. Requirements for computations on exams will be shared once the exam logistics have been finalized (see “Exam Logistics” under the Exam Policies heading).

Academic Integrity: It is expected that your exams and quizzes will contain only your own work, and that your assignments will contain only the work of your group. Any student who misrepresents their work in an exam, quiz, or project, or group who misrepresents their work on an assignment, will receive a grade of zero on that exam, quiz, project, or assignment; other sanctions may also be pursued, as allowed by University policy. Any homework assignment or quiz on which an academic integrity infraction has occurred cannot be dropped or replaced when computing a student’s final course grade.

ADDITIONAL CAMPUS POLICIES

Disability-Related Accommodations: All reasonable accommodations required for students with disabilities will be offered, as ensured by Article 1, Part 1 of the Student Code. Documentation of accommodations from the Division of Disability Resources and Educational Services (DRES) must be provided before accommodations are offered. Please provide this documentation to the instructor by the end of the first week of class to ensure that accommodations can be offered in a timely manner. If documentation is provided after this time, accommodations will be provided as soon as is practical, but may be delayed by a week or more from the time of the request. If you are concerned you have a disability-related condition that is impacting your academic progress, there are academic screening appointments available that can help diagnose a previously undiagnosed disability; you may begin exploring resources by visiting the DRES website (<https://dres.illinois.edu/>) and selecting “Apply for Services” at the top of the page.

Religious Observances: Illinois law requires the University to reasonably accommodate its students' religious beliefs, observances, and practices in regard to admissions, class attendance, and the scheduling of examinations and work requirements. You should examine this syllabus and the course calendar at the beginning of the semester for potential conflicts between course deadlines and any of your religious observances. If a conflict exists, you should notify your instructor of the conflict and follow the procedure at <https://odos.illinois.edu/community-of-care/resources/students/religious-observances/> to request appropriate accommodations. This notification should be provided in the first two weeks of classes, or within one week after the announcement of a course deadline for any deadline that is announced after the second week of class.

Sexual Misconduct Reporting Obligation: The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University’s Title IX Office. In turn, an individual with the Title IX Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: wecare.illinois.edu/resources/students/#confidential

Other information about resources and reporting is available here: wecare.illinois.edu

Family Educational Rights and Privacy Act (FERPA): Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <https://registrar.illinois.edu/academic-records/ferpa/> for more information on FERPA.

TENTATIVE LIST OF TOPICS

Introduction to Supply Chain Management	Planning in the Supply Chain
Supply chain objectives and components	Demand forecasting
Strategic fit and scope	Aggregate planning models
Tradeoffs between efficiency and responsiveness	Managing supply and demand
Demand and supply uncertainty	Supply chain coordination
Drivers of supply chain performance	
Distribution Networks	Inventory Models
Facility and transportation options and roles	Cycle inventory models
Facility location and capacity allocation models	Safety inventory models
	Replenishment policies
	Optimal level of product availability
Designing Global Supply Chain Networks	
Offshoring decisions	Cross-Functional Drivers (time permitting)
Risk management	Sourcing decisions (in-house vs. outsource)
Decision-making under uncertainty	Design collaboration
	Procurement
	Risk management in sourcing
	Pricing and revenue management

NOTE: The policies contained in this syllabus are subject to change. Any such changes will be posted on Canvas.